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UNITED STATES DEPARTMENT OF AGRICULTURE,
DIVISION OF ENTOMOLOGY,
WASHINGTON, D. C.

CIRCULAR OF INFORMATION IN REGARD TO THE WORK IN SILK CULTURE.

This Division has been charged with an investigation of the possibilities of profitable silk culture in the United States. Since it has already been shown that cocoons of excellent quality can be raised over practically the whole country (wherever the mulberry will grow), our first step is evidently to interest as many persons as possible in the cultivation of the silkworm in order that there may be a guaranteed supply of cocoons when the time comes for the establishment of silk reeling on a commercial basis. Therefore, to all persons wishing to engage in silk culture and who do not possess the necessary food plants, the Department will send mulberry cuttings in small numbers, and to those persons who already have the proper mulberry trees we will send, in season, enough of the silkworm eggs for a good start. It is hoped that before long private enterprise will take up the matter of erecting silk-reeling plants and thus create a permanent market for the cocoons. In the meantime, so long as Congress appropriates for the purpose, we will buy the cocoons at approximately the current European market price, which is from 75 cents to \$1 a pound for dried cocoons. We are operating a reel at this office in order to convert the cocoons into marketable raw silk.

Persons who desire silkworm eggs should request them in March, April, or May, giving a statement as to the number and kind of mulberry trees to which they have access. The leaves of the white mulberry (Morus alba) and its varieties moretti, rosea, japonica, and multicaulis make the best silkworm food. The Russian mulberry, another variety of Morus alba known as tartarica, is also an excellent variety for this purpose and is best suited to the Northern States. The leaves of Osage orange make very good silkworm food if the young and too succulent ones are avoided. The native red mulberry and the paper mulberry are not at all suitable.

We will distribute mulberry cuttings during winter and spring.

It is hoped that silk culture may prove of benefit to those members of families whose time is not altogether occupied in other ways, and also to other persons in a small way as a side issue.

Approved:

JAMES WILSON,

Secretary of Agriculture.

L. O. HOWARD,
Entomologist.

Washington, D. C., October 7, 1903.

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UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF ENTOMOLOGY,
WASHINGTON, D. C.

U. S. Department of Agriculture
Washington, D. C.

CIRCULAR OF INFORMATION IN REGARD TO THE WORK IN SILK CULTURE.

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Persons who desire silkworm eggs should request them in February, March, or April, *giving a statement of the number, size, and kind of mulberry trees or rods of Osage hedge to which they have access*, also previous experience (if any) in silk culture. The leaves of the white mulberry (*Morus alba*) and its varieties, *moretti*, *rosea*, *japonica*, and *multicaulis* make the best silkworm food. The Russian mulberry, another variety of the *Morus alba* known as *tartarica*, is also an excellent variety for this purpose and is best suited to the Northern States. The leaves of the Osage orange (*Toxylon pomiferum*) make a very good silkworm food if the young and too succulent ones are avoided. The native red mulberry (*Morus rubra*) and the paper mulberry (*Broussonetia papyrifera*) are not at all suitable. We will distribute mulberry cuttings and seedlings during winter and spring. These will require at least three years growth before they are large enough for use.

Any large airy room that can be properly heated and ventilated will answer for rearing purposes, one with an open fireplace perhaps being the best adapted. The eggs are hatched by exposing to the air on broad flat trays covered with paper, care being exercised at all times never to let either eggs or worms be in direct sunlight. The feeding, which comprises about six meals a day, can be attended to by children or other unemployed members of the family, and need not seriously interfere with regular household duties. The first meal should be as early and the last one as late as possible, care being taken at all times to use only clean leaves, free from moisture caused by rain or dew. The worms grow rapidly, changing their skins four times in about as many weeks, then grow restless, refuse to eat, and climb into brush prepared for them and proceed to spin their cocoons. About ten days from the time of spinning, the cocoons are gathered from the brush and, if intended for the market, are then subjected to steaming over a kettle or placed in an oven for a short time, the door being left open. This process is for the purpose of killing the chrysalis, into which by this time the worm has been transformed, as otherwise the chrysalis will soon change to the moth and perforate the cocoon in its attempt to escape, thus destroying the silken covering of the cocoon and impairing its value from a commercial standpoint. The chrysalis may also be choked or stifled by placing the cocoons in a tight chest or box with a small saucer of bisulphid of carbon and leaving over night. As bisulphid of carbon is particularly inflammable, great care must be exercised, in using this process, to see that the fumes do not come in contact in any way with fire. After killing the chrysalis, the cocoons should be dried thoroughly for several weeks in direct sunlight or by placing near a stove, and are then ready for the market. Thoroughly dried cocoons weigh only about a third as much as "green" or newly spun ones.

The above notes on rearing the worms and producing the cocoons are only intended to give a general idea of what the process consists, and it is not expected that anyone will attempt silk culture relying on this information alone. In order that the rearing may be thoroughly understood in detail, this Department will send a manual of instruction on silk culture, to those who do not already possess it, at the same time that the eggs are distributed.

It is hoped that silk culture may prove of benefit to those members of families whose time is not altogether occupied in other ways, and also to other persons in a small way as a side issue.

L. O. HOWARD,
Chief of Bureau.

Approved: _____
JAMES WILSON,
Secretary of Agriculture.

October 1904

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UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF ENTOMOLOGY,
WASHINGTON, D. C.

U. S. Department of Agriculture,
Washington, D. C.

CIRCULAR OF INFORMATION IN REGARD TO THE WORK IN SILK CULTURE.

This Bureau has been charged with an investigation of the possibilities of profitable silk culture in the United States. Since it has already been shown that cocoons of an excellent quality can be raised over practically the whole country (wherever the mulberry will grow), our first step is evidently to interest as many persons as possible in the cultivation of the silkworm in order that there may be a guaranteed supply of cocoons when the time comes for the establishment of silk reeling on a commercial basis. Therefore, to all persons wishing to engage in silk culture and who do not possess the necessary food plants, the Department will send mulberry seedlings or cuttings in small numbers, and to those who already have the proper mulberry trees (or Osage hedge) we will send, in season, enough of the silkworm eggs for a good start. It is hoped that before long private enterprise will take up the matter of erecting silk-reeling plants and thus create a permanent market for the cocoons. In the meantime, so long as Congress appropriates for the purpose, we will buy cocoons at from 90 cents to \$1.15 per pound, at point of shipment, for *thoroughly dried cocoons*. Shipments weighing less than four pounds may be sent by mail, and for this purpose a Government frank will be provided on application, thus putting the shipper to no expense for transportation charges. Small lots of cocoons weighing something over four pounds may be divided into several shipments, each package being under a separate frank. Absolutely no cocoons must be sent by mail unless choked and dried. This is important, as otherwise there is liability of injury to other mail matter en route. Shipping by express has been found too expensive, and its use is now discouraged. Large shipments should all go by freight, *charges collect*. In no case where transportation is *prepaid* can the charges be refunded by this Bureau, neither will shipments by express be credited with expressage under any condition. We are operating a reeling plant at this Office in order to convert cocoons into marketable raw silk.

Persons who desire silkworm eggs may request them at any time during the year, *giving a statement of the number, kind, and size of mulberry trees or rods of Osage hedge to which they have access*, also previous experience (if any) in silk culture. Distributions of eggs, however, will only be made from the last part of February to the last part of April, according to the locality where they are required. The leaves of the white mulberry (*Morus alba*) and its varieties *moretti*, *rosea*, *japonica*, and *multicaulis* make the best silkworm food. The Russian mulberry, another variety of the *Morus alba* known as *tartarica*, is also an excellent variety for this purpose, and is best suited to the Northern States on account of its ability to withstand severe winters. The leaves of the Osage orange (*Toxylon pomiferum*) make a very good silkworm food, if the young and too succulent ones are avoided and the thorns are removed before using. It is not so satisfactory, however, as the mulberry, and should not be employed if suitable mulberry trees are at hand. The native red mulberry (*Morus rubra*) and the paper mulberry (*Broussonetia papyrifera*) are not at all suitable. We will distribute mulberry cuttings and seedlings during winter and spring. These will require at least three years growth before they are large enough for use.

Any large airy room that can be heated properly and ventilated will answer for rearing purposes, one with an open fireplace perhaps being the best adapted. The eggs are hatched by exposing to the air on broad flat trays covered with paper, care being exercised at all times never to let either eggs or worms be in direct sunlight. The feeding, which comprises about six meals a day at first, can be attended to by children or other unemployed members of the family, and need not seriously interfere with regular household duties. The number of meals may later on be reduced to four daily. The first meal should be as early and the last one as late as possible, care being taken at all times to use only clean leaves, free from moisture caused by rain or dew. The worms grow rapidly in size, changing their skins four times in about as many weeks, after which time they become restless, refuse to eat, and climb into brush prepared for them, and proceed to spin their cocoons. About ten days from the time of spinning, the cocoons are gathered from the brush and, if intended for the market, are then subjected to steaming over a kettle or placed in an oven for a short time, the door being left open. This process is for the purpose of killing the chrysalis, into which by this time the worm has been transformed, as otherwise the chrysalis will soon change to the moth and perforate the cocoon in its attempts to escape, thus destroying the silken covering of the cocoon and impairing its value from a commercial standpoint. The chrysalis may also be choked or stifled by placing the cocoons in a tight chest or box with a small saucer of bisulphid of carbon and leaving over night. As bisulphid of carbon is particularly inflammable, great care must be exercised in using this process, to see that the fumes do not come in contact in any way with fire. After killing the chrysalis, the cocoons should be dried *thoroughly* for some weeks in direct sunlight or by placing near a stove or by other means, and are then ready for the market. In order to determine if the cocoons are thoroughly dried, cut open a few and crush the chrysalis between the fingers. If the chrysalis resolves into a dry powder, the cocoon is thoroughly dry, but if the chrysalis is soft and of the consistency of rubber, the cocoon has not yet been sufficiently dried out. Particular notice should be taken of the fact that *thoroughly dried cocoons weigh only about a third as much as "green" or newly spun ones*.

The above notes on rearing the worms and producing the cocoons are only intended to give a general idea of what the process consists, and it is not expected that anyone will attempt silk culture relying on this information alone. In order that the rearing may be thoroughly understood in detail, this Department will send a manual of instruction on silk culture, to those who do not already possess it, at the same time that the eggs are distributed.

It is hoped that silk culture may prove of benefit to those members of families whose time is not altogether occupied in other ways, and also to other persons in a small way as a side issue.

Approved:

JAMES WILSON,

Secretary of Agriculture.

L. O. HOWARD,
Chief of Bureau.

October 2, 1905.